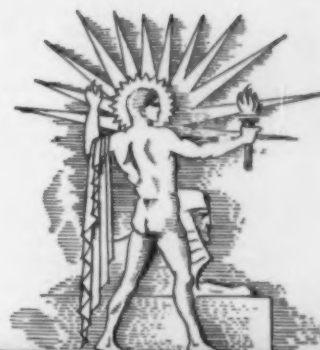


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



JULY 4, 1931

Young Gargoyle Out For a Walk

See Page 8

A

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VOL. XX

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Summary ofCurrent
Science

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DO YOU KNOW THAT

Wall paper appears at least five shades darker on the wall than on display in the store, says a home economics specialist of the University of New Hampshire.

A plant which grows in New Mexico, and known as carnaigre, is found to be a rich source of tannin used in preparing leather.

Approximately 12,000,000 persons in the United States get their living directly from cotton and cotton products.

A number of plants yielding essential oils grow wild in Persia, including asafoetida, chamomile, cumin, coriander, and violet.

The serious drought of 1930 showed government agriculturists that certain strains of corn had far more resistance to heat and the lack of moisture than other strains.

The coolest place in a refrigerator is the space below the ice.

The Congo snake has two pairs of very short legs, each ending in two or three toes.

Fish cannot see details clearly, hence their sudden darts into rocky recesses or grasses when any moving form appears.

A scientist states that the Bermuda Islands, which now have a land area of about 20 square miles, one covered about 300 square miles.

Turkish tradition says that attar of roses was discovered by a Moslem princess.

Copper fish hooks used by fishermen on the River Euphrates thousands of years ago are in the possession of the Field Museum, and are said to be not very different from modern hooks.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY		OCEANOGRAPHY	
5,000-Year Old Modern Art	9	Atlantis Will Work Way Across Atlantic	14
New Type of Prehistoric Indians	5	No Ice and No Charts	5
Seven Times Rebuilt Pyramid	3	ORNITHOLOGY	
Shoe of Saxon Child	9	Like to Appear Brave	9
ASTRONOMY		American Eagles	15
Encke's Comet Observed	15	PHOTOGRAPHY	
1932 Total Eclipse	4	Colored Movie Film	12
Paradoxes of the Skies	6	PHYSICS	
CONSERVATION		Aurora In Glass Tube	14
New 10,000-Acre Redwood Forest	8	Cheaper Ultraviolet Glass	7
ENGINEERING		Model Demonstrates Atom	3
Power Plant on Jordan River	4	Reflected Heat Melts Platinum	8
Ship Limitation Proposed	13	Ultraviolet Here and in Antarctic	8
ENTOMOLOGY		X-rays Without the Tube	9
Magnifying Eye	8	PHYSIOLOGY	
7,000,000 Acres of Locusts	3	"The Gastric Juice"—A Classic of Science	10
GENERAL SCIENCE		PSYCHOLOGY	
Book Reviews	16	Toy Hammer Tests Talent	13
MEDICINE		REFRIGERATION	
Improper Food May Cause Near-sightedness	13	Ice in Baskets	11
METALLURGY		SOCIAL SCIENCE	
Magnetism Hardens Steel	14	Discoveries May Hurt Disarmament	15
METEOROLOGY		VENTILATION	
Atmosphere Hot Above	7	Homes Like Sahara	8
		ZOOLOGY	
		Fish Eggs Saved from Bears	9

Science Service presents over the radio, an address

THE ROMANCE OF MEASUREMENT

By Henry D. Hubbard, Assistant to the Director, National Bureau of Standards, Washington, D. C.

Friday, July 10, at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSICS

Pictures of Spinning Model Demonstrate Atom Structure

California Scientist Photographs Unique Mechanism To Show How Electricity is Spread Out in Simplest Atom

PICTURES of what an atom looks like inside, according to the new theory of wave mechanics, have been made by Dr. H. E. White of the University of California, Berkeley. Recently scientists have used only a mathematical formula for this purpose, as a visible picture was supposed not to give a true representation of the atom.

Dr. White has made a rotating mechanical model, which, when set in motion and photographed, gives a good idea of how electricity is spread out inside the simplest known atom, that of hydrogen. These photographs show beautiful designs which differ according to the amount of energy the atom has.

Formerly Like Solar System

Before the now-accepted theories of Heisenberg, Schroedinger and Dirac, the atom was thought to be somewhat like the solar system: the electrons were imagined as particles whirling around the positive nucleus in the center of the atom like the planets around the sun. Now the atom is thought of as being more like a swarm of bees around a hive, when the observer is too far away to see the individual bees. The thickness of the cloud represents the average density of electricity at any point.

The electron has thus been replaced by a cloud of electricity of variable density, which is more difficult to imagine than the path of the particle-like electron.

A mathematical formula, according to the newer physics, gives a much better representation of how an atom is built than a model or picture. Since the formulation of the famous new quantum theory, it has been considered rather a step backward to make a picture of the atom. However, Dr. White has ignored this belief and made pictures which are both beautiful and interesting.

Dr. White's model consists of a spindle which can rotate at any angle to the horizontal. One of the ends of the spindle vanes is connected by a string to a little ball which moves steadily back and forth in a groove of curious shape.

The string controls the angle that the rotating spindle makes with the horizontal. Thus an accurate representation of the electron density in the atom can be obtained by photographing the rotating spindle.

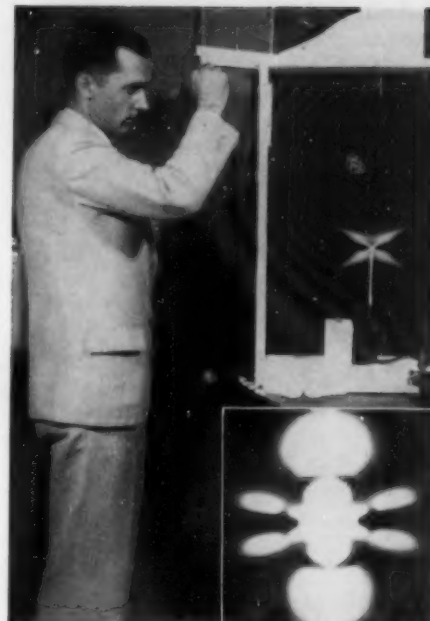
Science News Letter, July 4, 1931

ENTOMOLOGY

7,000,000 Acres of Locusts Hatching in East Africa

THE KENYA Agricultural Department reports that locusts are hatching over an area of seven million acres in the Kenya district of East Africa. In addition to this the laying of locust eggs is proceeding over hundreds of miles of dense tropical vegetation in Uganda. The town of Masindi was recently inundated by locusts, forcing all shops to close.

In the Kenya district the Agricultural Department is effectively combating the locusts, twelve hundred bags of poisoned bait being issued daily, while there is also spraying and trench trapping. In the Uganda district there



LOOKS LIKE AN ATOM

Dr. White is spinning his mechanical model of the hydrogen atom to get the flat "X" shape which represents the distribution of electricity of the simplest atom for one of its energy states. For the various states, many interesting figures are obtained. Another is shown in the lower right insert.

is no adequate policy of destruction and great fears are expressed by the neighboring districts regarding the damages anticipated when the eggs mature. Fortunately for Kenya, the crop damage will be comparatively small, since a greater part of the infested seven million acres is not under cultivation.

Science News Letter, July 4, 1931

ARCHAEOLOGY

Seven Times Rebuilt Pyramid Explored at Tenayuca, Mexico

SEVEN SEPARATE TIMES enlarged or reconstructed, and perhaps as many different times the center of distinct occupations—this is the story the Aztec pyramid at Tenayuca has unfolded. Mexican archaeologists under the direction of Jose Reygadas Vertiz have continued to open up structure within structure until they at last feel they have reached the core.

While tunnelling last year through the older of two superposed pyramids, a third pyramid within the second was discovered. This new structure was

different from all other Mexican pyramids previously known, for it was formed of practically vertical stepped-back bodies instead of the usual inclined ones. Now within pyramid three, remains of a number four have come to light.

Study of the architectural features reveals that in addition to the four structures, one within the other, some of these in their time had been enlarged. So that in this pyramid that was once the capitol building of an Indian city of unknown history but which was Aztec at the time of the Conquest, seven

major modifications have taken place. Seven, according to present findings, says Mr. Reygadas, mindful that two, three, four, five and six was what he once believed in.

From a maguery-covered hill several years ago, the pyramid of Tenayuca has come out of its chrysalis as one of the most interesting sites near Mexico City, and the most important Aztec site in the country. The final report now in prep-

aration will add more positive knowledge in the field of Aztec archaeology than that of any other one site.

The pyramid is now honeycombed with tunnels that circumviate and penetrate, and which are lighted with electric lights, protected by corrugated metal roofing, and sustained by beams, so that a model silent lecture on archaeology may be safely had while going through.

Science News Letter, July 4, 1931

ASTRONOMY

1932 Total Eclipse Will be Attraction for Vacationists

VACATION planners who look a whole year ahead can now figure on adding a total eclipse of the sun to the other thrills they seek. The eclipse of August 31, 1932, will cross considerable parts of New England and the Province of Quebec, both favorite vacation lands.

The official calculations of the path of the eclipse, together with weather information to aid in the selection of the best place, and a large scale map of the path, have just been issued by the United States Naval Observatory, Washington. The material has been published in pamphlet form, as a supplement to the American Ephemeris, which is the astronomer's bible. The supplement can be obtained for 25 cents from the Superintendent of Documents, Washington, D. C.

The exact path over which the moon's shadow will sweep has been calculated by Prof. James Robertson, director of the Nautical Almanac Office. It will cross Cape Cod, the northeastern corner of Massachusetts, all of New Hampshire but the southwestern third, the southern and western part of Maine, the northern part of Vermont and a large section of the Province of Quebec. Montreal and Portland are the largest cities within the path.

Other places near the center from which a good view should be obtained, are Saco and Alfred, Me.; North Conway and Lancaster, N. H.; Guildhall, Vt.; Waterloo, St. Gabriel and Sorel, P. Q. At these places the sun will be obscured by the moon for nearly the full duration of one minute and forty seconds.

Places a little farther from the center line where the eclipse will last for about a minute or more are: Glou-

cester and Newburyport, Mass.; Auburn and Paris, Me.; Dover, Rochester, Farmington, Ossipee, Wolfeboro, Littleton and Colebrook, N. H.; St. Johnsbury and Newport, Vt.; Sherbrook, Farnham and Three Rivers, P. Q.

On the afternoon of Wednesday, August 31, the shadow of the moon will sweep down from the northwest. About 3:23 p. m., eastern standard time, it will reach the St. Lawrence River. At 3:32 p. m., it will reach Cape Cod, which will be the last land to see it. Then the shadow will sweep on over the ocean, leaving the earth in mid-Atlantic.

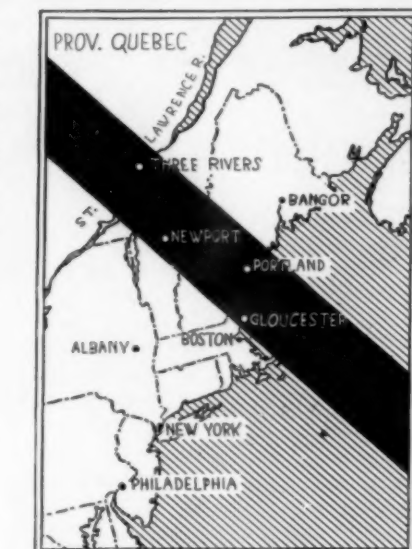
The Naval Observatory astronomers believe that little choice is afforded, and there is probably an even chance of

ENGINEERING

Jordan River, Ideal for Power, Is Made to Yield Electricity

PALESTINE is being modernized. With the completion of three hydro-electric power stations now being erected on the historic river Jordan, with the ribbing of the long, narrow valley of the Holy Land with concrete canals, and the utilization for a storage reservoir of the Sea of Galilee on whose waters Christ walked two milleniums ago, the Holy Land is becoming modern and industrial.

The Jordan is readily adaptable to hydro-electric power, with its 3,000-foot drop from its source on Mount Hermon to its mouth in the Dead Sea, a saline lake 1,300 feet below the level of the Mediterranean and farther be-



PATH OF COMING ECLIPSE

Which has just been calculated by astronomers at the U. S. Naval Observatory.

clear weather at any point along the path from the St. Lawrence River to the coast.

Another chart in the supplement shows the stars and planets that will be visible near the eclipsed sun. The planet Jupiter will shine brilliantly just to the right, and a little farther over will be the star Regulus and the planet Mercury. The star Spica will appear at a somewhat greater distance to the left, and two second magnitude stars, Denebola and Alpherat, will be above and below.

Science News Letter, July 4, 1931

low the sea level than any other body of water in the world. And with the diversion of seasonal flood waters of the Yarmuk and the Jordan rivers into the Sea of Galilee as a huge reservoir, and with the building of suitable dams and canals, 5,000,000 tons of water will be at the disposal of engineers every day during both the wet and dry seasons. These three power stations will total 48,000 horsepower output, and are the first step in a plan for the complete electrification of Palestine.

The first of these power stations is now completed at Jisr-el-Mujameh, drawing its water power from a canal carrying waters from the Yarmuk River,

a tributary to the Jordan. This station delivers 18,000 horsepower in electricity, with provisions for doubling this amount.

All three power plants will be joined together to supply the needs of every city, town, and agricultural settlement in Palestine, and while the plants are privately owned the government is to regulate the charges in a manner similar to the way public utilities are regulated in the United States.

Science News Letter, July 4, 1931

OCEANOGRAPHY

No Ice in North Atlantic; Ice Charts not Published

LACK OF BUSINESS has caused the suspension of another publication; but for once regrets are not in order. The suspended publication is the Ice Supplement to the North Atlantic Pilot Chart, usually published throughout late spring and summer, to inform transatlantic shipping regarding the number and distribution of icebergs in steamer lanes. So far this year not a single iceberg has reached the steamer tracks, so that the Ice Supplement has nothing to report, and has been suspended until conditions again justify its publication.

Science News Letter, July 4, 1931

Some of the swords and daggers used by Mayan Indians in Yucatan were of cholut wood, which is extremely hard.

ARCHAEOLOGY

New Type of Prehistoric Indians Found in Texas

Scientist Forced to Crawl Through Long Narrow Cave And Labor in Dust to Bring Out Relics of Tribe

A NEW TYPE of prehistoric Indian life has been discovered by F. M. Setzler, of the U. S. National Museum, as a result of an exciting adventure in Texas cave exploration.

The Museum received word of an Indian cradle remarkably different from the run of ancient American cradles. The cradle had been found within this cave in the Big Bend region of Texas. Mr. Setzler set out to explore and has returned to Washington, having succeeded in removing from the cave a collection of articles which belonged to the cavern dwellers. The objects were obtained under difficulties such as are rarely encountered even by adventurous archaeologists.

The cave opening had been almost closed by falling boulders, and more boulders still hang at precarious angles ready to crash down when some key-stone slips. To enter the cave it was necessary to crawl twenty feet down a passage no more than two feet high. Rattlesnakes, scorpions and rats were the

present-day inhabitants of the cave, the archaeologist soon found. Dust in the cavern chamber was so thick that dust masks had to be worn, and even then the dust sifted through the masks after a short time in the chamber.

No lantern could be kept lighted in this dust-laden air. Flashlights were more successful. They lighted up a small circle of the darkness, sufficiently to allow Mr. Setzler and four Mexican laborers to dig and remove dirt from the cave. The four-foot layer of earth containing the remains of the cave's ancient inhabitants was excavated and examined by the archaeologist himself, and then five feet of earth below that was dug up, on the chance that it might contain small objects or bones of animals. This dirt was transported out of the cave by a bucket brigade. As each bucket load was ready, one man passed it to the next along the low, cramped passage-way until it was finally outside, where it could be sifted, in order to salvage any remaining small relics or bones.

The articles which the cavern contained are cradles, baskets, pieces of matting, sandals. The poorly preserved bones of a child were the only human remains discovered. No trace of European objects, or anything to indicate that these people had ever encountered Europeans appeared. The articles found are different from those made by any known Indian tribe. The fact that the cave inhabitants had baskets but no pottery suggests that they may have been contemporaries of the Basket Maker Indians who lived in the Southwest about the time of Christ and perhaps for two thousand years before. Pottery was introduced at the close of the Basket Maker era, about the time the Pueblo tribes came into the Southwest.

Who the newly discovered people were, and whether they were related to the Basket Makers or to Mexican Indians or to tribes from the east, remains for science to determine. Texas prehistory is comparatively little explored as yet, Mr. Setzler pointed out.

Science News Letter, July 4, 1931



ON THE BANKS OF THE JORDAN RIVER

The new 18,000 horsepower hydro-electric plant at Jisr-el-Mujameh, one of three projects that will supply the Holy Land with abundant power for agriculture and manufacturing.

ASTRONOMY

Paradoxes of the Skies

By JAMES STOKLEY

JULY—hot weather; that is the sequence of thought for most people, at least in countries of the northern hemisphere. As the July sun beats down unmercifully, there is some satisfaction, perhaps, in recalling that at this time of year it is about three million miles farther away than it was last January, in the middle of winter.

On the average the earth's distance from the sun is about 92,870,000 miles. But the earth's orbit is not truly circular, it is elliptical. Last January the earth was in perihelion, which meant that it was then nearest the sun. On July 3, at five o'clock in the evening, eastern standard time, the earth is in aphelion, farther from the sun than at any other time during the year. However, the difference between the two distances, great as it is by our terrestrial standards, is very small compared with the vast distance to the sun at all times. The slight change in the amount of heat due to the changing distance is much more than neutralized by other factors.

The sun is the nearest of all the stars, indeed it is the only star that we can see as an actual disc rather than as a mere point of light. But even so, its distance is so vast that it is hard to realize what the figure, 92,870,000 miles, really means. A projectile from a large gun travels with a speed of as much as 3,500 feet per second, or about 40 miles a minute. This would take it completely around the world in a little over ten hours, assuming, of course, that it could travel with undiminished speed. However, traveling at the same speed, the projectile would require four and a half years to get to the sun. Only 499 seconds are required by the sun's light to cross the gap separating us.

Why More Heat in Summer

Let us see just why the heat is greater in summer than in winter. The light and heat from a glowing body varies not as the distance, but as the square of the distance. Suppose you have two electric lamps, one two feet away, the other four, and you have an instrument for measuring the intensity of the radiated energy received, part in the form of heat, and part as light. You will find that from the more distant

lamp you get only a quarter as much radiation as from the nearer one. The intensity varies as between four and sixteen, not as between two and four. According to this "law of inverse squares" the earth receives about seven per cent. more heat from the sun in January than now.

This being the case, you ask, why is it hotter now? The answer is that the figure of seven per cent. only refers to the radiation received by a certain area with the sun at the same angle in both instances. In January, the sun was closer than now, but also it was far to the south, and the rays from it struck the earth at a low angle. Imagine a beam of sunlight a yard square. When it strikes the earth at an angle of 30 degrees, as in winter in the United States at noon, the yard-square beam will cover an area of two square yards, so that the heating effect is only about half of what it would be when the sun is overhead.

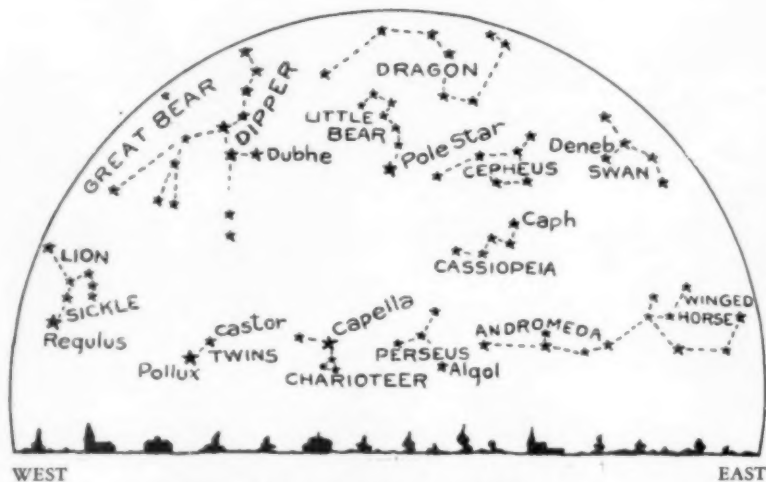
Concentrating Sun Energy

Now, in summer the sun is higher in the sky. At noon it is about 70 degrees above the horizon instead of 30. As a result, the yard-square beam is confined to an area of about one and a tenth square yards of the earth's surface, so we get nearly twice the heating effect as in winter. The seven per cent. difference due to distance is much less than the difference due to the angle of

the sun, and it merely serves to keep the extremes within narrower limits.

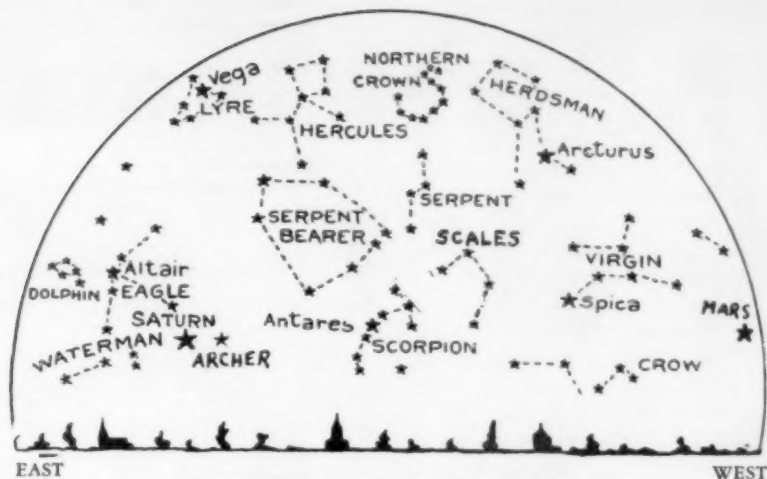
Of course, all this only applies for northern countries. In the southern hemisphere the sun is low when it is high for us, and high when low in our southern sky. Therefore they have winter in June, July and August, and summer from December to February. The seven per cent. increase in the sun's heat when nearer comes at the same time that it is hotter for other reasons, so that for southern latitudes as far south as we are north, the winters tend to be a little colder and the summers a little hotter than in the United States.

This is not the only curious astronomical effect due to living south of the equator instead of north. For one thing, the man in the moon appears upside down, for the moon, like the sun, shines in the northern, and not the southern sky. Also, we think of the sun and the moon as crossing the sky from left to right. We see these bodies to the south, and when we face that direction the east is on the left, and the west to the right. But a person in New Zealand, for example, looks to the north to see these bodies. They still cross the sky from east to west, but the east is now to the right. This is normal for the New Zealanders, but to a person from northern countries, things seem to be backwards. The New Zealander, on the other hand, feels that things run backwards when he comes north.



NORTHERN SKIES DURING JULY

Containing in their center the well-known Pole Star whose position remains fixed while other stars change places from month to month.



THE TWO BRIGHTEST STARS

Vega and Mars are found in the southern July skies, the first high in the east and the second low in the west

Jupiter, the planet that was so brilliant in the evening sky in recent months, is now close to the sun and invisible. Saturn succeeds to its place as the conspicuous planet. On the thirteenth of the month it is directly opposite the sun, and then it rises at sunset. Thus it is visible low in the eastern evening sky. Its steady light, brighter than any nearby star, makes it easy to identify. Of the stars now visible, only Vega, shining high in the east, and Arcturus, high in the west, exceed it in brilliance, and even they are only slightly brighter. A second planet to be seen these July evenings is Mars, low in the west. It can be located by its steady, red light.

Six first magnitude stars are to be seen in the evening sky this month. Brightest of all is Vega, in Lyra, the lyre, nearly overhead, to the east of the zenith. Below Vega is Cygnus, the swan, sometimes known as the Northern Cross. The cross is lying on its side. The bright star Deneb, at the northern end, also marks the tail of the swan. High in the southeast is the constellation of Aquila, the eagle, containing the bright star Altair.

In the south, near the horizon, is the ruddy Antares, marking the group of Scorpius, the scorpion. The tail of the animal runs from Antares to the southeast, curving at its end in a very realistic manner. High in the western sky is the constellation of Bootes, containing Arcturus, second brightest star now in the evening sky. Below this group is Virgo, the virgin, in which Spica shines.

After reaching the phase of last quarter on the seventh of the month, the

moon is new on the fifteenth. By the twenty-second it reaches first quarter, when it is directly south at sunset. It is full on the 29th, so the last two weeks of the month will be favored by bright moonlight evenings.

Science News Letter, July 4, 1931

PHYSICS

New Process Cheapens Ultraviolet Glass

DEVELOPMENT of a completely automatic process of manufacturing window glass of high ultraviolet transparency has made possible the production of this glass in quantity at about one-fourth the cost under old methods. The new glass has been described by Donald E. Sharp, glass technologist.

METEOROLOGY

Atmosphere Said to be Very Hot Fifty Miles Above Earth

JUST A MERE fifty miles above our heads the temperature is between a thousand and two thousand degrees Fahrenheit, according to a new theory of the earth's atmosphere presented by Prof. B. Guthenberg of the California Institute of Technology. This extremely hot weather a few miles up comes as the result of Prof. Guthenberg's novel theory that the atmosphere is practically the same in composition throughout and not exclusively helium in some high

The new process has been installed in a large commercial plant in which, during the first month of operation under the new system, approximately 200,000 square feet of ultraviolet transmitting glass were manufactured. Production for the remainder of the year is expected to reach nearly 2,000,000 square feet.

While methods of making ultraviolet transmitting glass have been known for years, Mr. Sharp explained, it has been possible to make glass of workable commercial quality only in relatively small amounts with much hand labor and at great cost. Although glass made under the new process still costs two or three times as much as ordinary glass, it is cheaper than plate glass and about 75 per cent. less than it was six months ago.

Technical difficulties involving composition, crystallization, and annealing are overcome by the new process, Mr. Sharp stated. It was explained that a special variation of the Fourcault window glass system, which permits the drawing of large, continuous sheets, is used. As is generally known, this glass must be almost entirely free of iron.

"Up to the present, attempts to make ultraviolet transmitting glass in this country by automatic means have resulted only in the production of glasses which in ordinary thickness had an ultraviolet transmission of only two or three per cent. for the ultraviolet wavelength known as 302 millimicrons. The new process produces a glass that will transmit permanently through the standard thickness of about eight one-hundredths of an inch, more than 50 per cent. of the ultraviolet light it receives from the sun."

Science News Letter, July 4, 1931

layers, as other physicists have concluded. Although the temperatures are high in the heights of the stratosphere, the air is very diffuse and thin. Only a rocket could actually penetrate the atmospheric heights to bring back evidence of what actually exists there, Prof. Guthenberg said. The shells of the long range gun used by the Germans in bombarding Paris probably traveled in a highly heated region.

Science News Letter, July 4, 1931

PHYSICS

Mirrors Reflect Heat To Melt Platinum

A COPPER burning mirror which reflects to a focus the rays from an electric arc instead of from the sun has been perfected in Stockholm at the Metallographic Institute by Prof. C. A. F. Benedicks and Dr. J. Harden. Temperatures of over 3,600 degrees Fahrenheit have been obtained with its aid.

An electric arc between poles of carbon, carrying up to 100 amperes of current, is fixed at one focus of an elliptical mirror 17 inches in diameter, and the heat and light rays are concentrated at another point some distance away. A high temperature can thus be made at this second focus.

Rapid heating and freedom from admixture with foreign substances are advantages of this method of producing high temperatures. A piece of platinum, which requires a temperature of 3,250 degrees centigrade to melt it, was reduced to the molten condition in four and a half minutes. About 25 per cent. of the energy put into the arc is effective in producing the hot spot.

Mirrors have been used to produce high temperatures from the sun's rays throughout history. There is, however, a natural limit to the heating power of such a device, since a mirror of given size can only pick up a certain definite amount of the sun's rays.

Solar furnaces of this kind using parabolic reflectors have recently been perfected at Jena, Germany, by Prof. Rudolf Straubel of the Zeiss Optical Works and at the new astrophysical laboratory of the California Institute of Technology, Pasadena, California. Carbon, one of the most refractory of all substances, has been melted in these furnaces at a heat of 5,400 degrees Fahrenheit.

Science News Letter, July 4, 1931

CONSERVATION

10,000-Acre Redwood Forest Becomes California Park

TEN THOUSAND acres of the finest redwood forest land in existence, comprising the famous Bull Creek Flat country, has been added to the state park system of California, the Save-the-Redwoods League has announced.

This acquisition marks a high point in a long campaign by the League, backed by many private donors and by the official support of the state, to pre-

serve for future generations some of the best representative stands of the coast redwood, just as its botanical relative, the sequoia or big tree, has been saved, largely in the National Parks. Together with previously acquired park lands in the Humboldt State Redwood Park, the total area preserved in this region is approximately 16,000 acres. While there still remain redwood forest lands, particularly along the Redwood Highway, which it is hoped can ultimately be acquired.

Science News Letter, July 4, 1931

PHYSICS

Ultraviolet Much the Same In Antarctica as Here

ULTRAVIOLET light observed on the Antarctic continent by scientists of the Byrd expedition is very similar in nature to that observed in Washington. The photographs on which this conclusion is based were made at the bottom of the world by Malcolm P. Hanson, and the findings announced jointly by himself and Dr. E. O. Hulburt of the U. S. Naval Research Laboratory.

The rainbows formed by the light of both the sun and also of the moon during the long night of the Antarctic, were measured and found to contain practically the same range of colors. These spectra are of importance to science as indicating that the quantity of ozone in the upper atmosphere does not change with the seasons and is much the same in different parts of the world. The comparison spectra were made with similar equipment by the Naval Research Laboratory in Washington.

The short wave limit in the ultraviolet was found to be much the same in November and January in Little America as it was in December or January in Washington.

The penetration of the shortest light waves is prevented by the presence of small amounts of ozone, a form of oxygen, in the upper atmosphere. The amount of this gas is astonishingly small in view of its importance for protecting mankind from too severe sunburn. The thickness of the ozone layer that keeps back the shorter waves from penetrating the atmosphere would be only about one-eighth of an inch if brought down to the surface of the earth.

The moon spectra were taken in April and July by the expedition, both observations being made during the Antarctic winter night.

Science News Letter, July 4, 1931

IN SCIENCE

ENTOMOLOGY

Magnifying Eye Would See Strange Things

See Front Cover

IF WE could only convert our eyes into magnifying glasses at will, we would see a lot of astonishing things that escape us now because they are too small. The little walking gargoyle shown on the front cover of the SCIENCE NEWS LETTER, for example.

It is a juvenile stage of a very common insect, which we ordinarily pass by as just another "bug." But here he is, magnified only sixteen times by Cornelia Clarke's camera, and he assumes an appearance more bizarre than the imagination of a Persian artist, more impossible than the figures in a medieval bestiary.

Science News Letter, July 4, 1931

VENTILATION

Homes Are Unlike Sahara Only in the Summer

THE average home in winter is drier than the Sahara Desert, according to experiments in relative humidity conducted by Edwin Fleischman, industrial heating engineer of Buffalo, N. Y. Few realize that during each of the winter months from fifteen to twenty gallons of water per room should be evaporated. July and August are the only months when water need not be evaporated indoors to provide adequate moisture, Mr. Fleischman said.

Customary provisions for increasing moisture, such as pans of water on stoves, do not give nearly enough evaporation, according to his experiments. Water should be boiled several hours daily in each room during the winter, if the air is not to be so dry that it will cause colds and increase coal bills by

During September a gallon of water per room should be evaporated, and the amount should increase to a peak in January, it was found. Should too much moisture be evaporated, water droplets will form on window panes.

Science News Letter, July 4, 1931

NCE FIELDS

ARCHAEOLOGY

Shoes of Saxon Children Unearthed in London

A LITTLE old leather shoe worn by a child of the Saxons about the tenth century A. D. has been acquired by the Royal Ontario Museum, Toronto, and is regarded as a very special treasure.

Prof. C. T. Curelly, director of the Museum, who has brought the shoe from London, stated that three of these shoes were unearthed recently during excavations in London. They are the first pieces of Saxon footgear ever discovered in England.

The design of the shoe is different from anything known in shoe structure, Prof. Curelly declared. Holding the little flattened leather object carefully in his hand, he pointed out that "the sole carries up from the back in a wedge to a point, where the two sides meet." The shoe would have been only an inch and a half high on the foot. The sole is fastened by thin leather loops, about three of them to an inch.

A hole in the toe indicates that the child wore the shoe out before it was lost or discarded. The moccasin-like shoe afforded no protection against wet ground, Prof. Curelly pointed out, but the Saxon child would have worn no stockings, and when his feet got wet they doubtless dried quickly.

Science News Letter, July 4, 1931

ZOOLOGY

Bears "Given the Works" To Save Fish Eggs

BEARS CAUGHT robbing the traps at the Yellowstone fish hatchery recently were "given the works," but not to a fatal degree.

It happened this way, according to Park Naturalist Alfred H. Povah. The traps, placed at the most advantageous spots in a number of creeks, were supposed to catch quantities of fish ready to spawn, and thus supply plenty of eggs for restocking purposes. Plenty of fish were seen in the creeks on their

way to these spawning grounds, but the traps remained empty. The fish culturists, acting as piscatorial detectives, solved the mystery. Through a few scattered eggs lying along the bottom of the creek just below the trap, they deduced the fact that bears were robbing the traps, and decided to administer an unforgettable lesson.

These traps were inclosed in a fence of wire screening about three feet high. Inside this and about one inch away from it, the hatchery men strung a single strand of heavy copper wire. This was connected with two large storage batteries, hidden in a nearby box, in such a way that when the wire screening was pushed against the copper wire an electric contact was made. The fact that the bear depredator had to stand in water to reach the trap assured a "ground" for the electric current through the animal. This current, while not strong enough to injure the bears, gave them a positive deterrent against fish forays.

Within a week after the shocking apparatus was installed the trap was full of fish—and there will be plenty of eggs for restocking the lakes and streams.

Science News Letter, July 4, 1931

PHYSICS

X-Rays Made Without Using X-Ray Tube

X-RAYS have been produced by a new method which does not require the use of the usual X-ray tube, by M. G. Reboul of the Physics Laboratory, Montpellier, France. The X-rays are produced when electric currents are driven through solids of high electrical resistance with the help of high electrical pressures.

In materials that conduct the electric current badly, like the magnesia, alum and yellow oxide of mercury used in these experiments, most of the voltage used is taken up in driving the current across one end of the specimen. At this point where the large fall of voltage occurs, X-rays of low penetration are produced.

In order not to interfere with the emission of the radiation, the electrode at which this large fall of voltage occurs is given a grid form. The material used is in the form of rods, about three and a half inches long and an inch in diameter, surrounded by ebonite, and an arrangement is provided for pressing the electrodes against the ends of the rod by means of an ebonite screw.

Science News Letter, July 4, 1931

ORNITHOLOGY

Male Pheasants' Valor Outruns Discretion

FEMALE pheasants have more sense than the males, or at least believe in safety first, according to Oscar Johnson, head of the Conservation Department of South Dakota.

During a storm, Mr. Johnson reported to the American Game Association, the hen pheasant will seek shelter at once and tuck her head under her wing. Her mate, however, evidently has never learned that at times discretion is the better part of valor. Instead, he tilts at the storm, head in the air. As a result of this defiance of the elements, Mr. Johnson stated that hundreds of cock pheasants died during the past winter of frozen, ice-clogged mouths.

Science News Letter, July 4, 1931

ARCHAEOLOGY

Unearth "Modernist" Art Five Thousand Years Old

FIVE THOUSAND years ago artists in Mesopotamia were turning out expressionist art, and doubtless the public of those days said that art was getting entirely too modern and peculiar.

Specimens of this ancient expressionistic art have just been received by the University of Pennsylvania Museum from its expedition which has been excavating at Tepe Gawra in Mesopotamia. The expedition worked in conjunction with the American Schools of Oriental Research and Dropsie College. A cylinder seal bearing the picture of a goat is pronounced decidedly expressionistic in style, as is also a stamped seal portraying an ibex.

An exquisitely painted clay chalice shows a more conservative art style. The pottery was made in an early age of civilization, when a comparative state of leisure existed, according to Dr. Ephraim A. Speiser, who served as field director of the expedition at Tepe Gawra. When the people acquired knowledge of using metal, they found that the new conveniences and labor aids speeded up their mode of living, and the painted clay dishes and ornaments gave place to articles of a more utilitarian nature.

More than 300 objects from the excavations have been sent to Philadelphia, the majority of them dating from the early Bronze Age. A copper frying pan with handle complete is a rare exhibit. A mold for casting bronze objects is also of unusual interest.

Science News Letter, July 4, 1931

PHYSIOLOGY

The Gastric Juice

"A Classic of Science"

A Trapper, Recovered From a Shotgun Wound Which Pierced His Stomach, Acted as Laboratory for These Tests

EXPERIMENTS AND OBSERVATIONS ON THE GASTRIC JUICE AND THE PHYSIOLOGY OF DIGESTION. By William Beaumont. Plattsburgh, Printed by F. P. Allen, 1833. (Facsimile Reprint: Cambridge, Harvard University Press, 1929).

THE gastric juice has been submitted to chemical examination and analysis, with various results. Perhaps in the present state of the science of chemistry it will not be practicable to ascertain its exact chemical character. The parcels heretofore submitted to analysis, have been very impure; but the result of even these partial examinations, has been to show that this fluid contains a portion of free muriatic acid, combined with the acetic, and some salts. In the winter of 1832-3, I submitted a quantity of gastric juice, with no other admixture, except a small proportion of the mucus of the stomach, to Professor Dunglison, for examination, who, with the assistance of the professor of chemistry of the Virginia University, effected the following analysis, and was kind enough to communicate the result to me by letter.

"University of Virginia,
Feb. 6th, 1833.

"My Dear Sir:

"Since I last wrote you, my friend and colleague, Professor Emmett, and myself, have examined the bottle of gastric fluid which I brought with me from Washington, and we have found it to contain free *Muriatic* and *Acetic* acid, *Phosphates* and *Muriates*, with bases of *Potassa*, *Soda*, *Magnesia* and *Lime*, and an animal matter, soluble in cold water, but insoluble in hot. We were satisfied, you recollect, in Washington, that free muriatic acid was present, but I had no conception it existed to the amount met with in our experiments here. We distilled the gastric fluid, when the free acid passed over; the salts and animal matter remaining in the retort. The quantity of

Chloride of Silver thrown down on the addition of the Nitrate of Silver, was astonishing."

I had been long convinced of the existence of free muriatic acid in the gastric fluids. Indeed, it is quite obvious to the sense of taste; and most chemists agree in this, however they may be at variance with respect to the other constituents. The analysis of Professors Dunglison and Emmett is certainly as satisfactory as any that has as yet been made. It is a question, too, whether gastric juice, in so great a state of purity, has ever before been submitted to chemical analysis.

It is to be hoped that no one will be so disingenuous as to attribute to Professor Dunglison the design of finding the existence of certain chemical agents in the gastric juice, with the view of propping the theory of the chemical action of this fluid, which he has maintained in his work on "Human Physiology";—or, in other words, to say, that he had determined to find certain results; and that he had accordingly found them. Those who are acquainted with him, know that his candour and fairness are above the reach of suspicion; and that he would be equally willing to retract a false opinion as to maintain a correct one. Another quantity was sent to him for further analysis; but I regret that no report has yet been received from him . . .

Action of Gastric Juice

The discrepancy of results in the reports of those who have had opportunities of examining the process of, and have made experiments on, *artificial digestion*, by the gastric juice, as well as in the chemical examination of this fluid, has been owing more to the difficulty of obtaining it pure, in sufficient quantity, and under proper circumstances, than to any real difference in its effects. Under the circumstances in which the following experiments were made, I flatter myself that these difficulties have been obviated; and if the

inferences are incorrect, the blame must be attached to the experimenter. He can only say, that the experiments were made in good faith, and with a view to elicit facts.

I think I am warranted, from the result of all the experiments, in saying, that the gastric juice, so far from being "inert as water," as some authors assert, is the most general solvent in nature, of alimentary matter—even the hardest bone cannot withstand its action. It is capable, *even out of the stomach*, of effecting perfect digestion, with the aid of due and uniform degrees of heat (100° Fahrenheit) and gentle agitation, as will be seen in the following experiments.

The fact that alimentary matter is transformed, in the stomach, into chyme, is now pretty generally conceded. The peculiar process by which the change is effected, has been, by many, considered a problem in physiology. Without pretending to explain the exact *modus operandi* of the gastric fluid, yet I am impelled by the weight of evidence, afforded by the experiments, deductions and opinions of the ablest physiologists, but more by direct experiment, to conclude that the change effected by it on aliment is *purely chemical*. We must, I think, regard this fluid as a chemical agent, and its operation as a chemical action. It is certainly every way analogous to it, and I can see no more objection to accounting for the change effected on the food, on the supposition of a chemical process, than I do in accounting for the various and diversified modifications of matter, which are operated on in the same way. The decay of the dead body is a chemical operation, separating it into its ele-

More Earths From Yttrium

Chemists kept taking new elements out of the rare mineral from Ytterby, as though it were a nest of Chinese boxes. The first accounts of the appearance of several of these elements will compose

THE NEXT CLASSIC OF SCIENCE

mentary principles—and why not the solution of aliment in the stomach, and its ultimate assimilation into fibrine, gelatine and albumen? Matter, in a natural sense, is indestructible. It may be differently combined; and these combinations are chemical changes. It is well known that all organic bodies are composed of very few simple principles, or substances, modified by excess or diminution of some of their constituents.

The gastric juice appears to be secreted from numberless vessels, distinct and separate from the mucous follicles. These vessels, when examined with a microscope, appear in the shape of small lucid points, or very fine papillæ, situated in the interstices of the follicles. They discharge their fluid only when solicited to do so, by the presence of aliment, or by mechanical irritation.

A Clear, Transparent Fluid

Pure gastric juice, when taken directly out of the stomach of a healthy adult, unmixed with any other fluid, save a portion of the mucus of the stomach, with which it is most commonly, and perhaps always combined, is a clear, transparent fluid; inodorous; a little saltish; and very perceptibly acid. Its taste, when applied to the tongue, is similar to thin mucilaginous water, slightly acidulated with muriatic acid. It is readily diffusible in water, wine or spirits; slightly effervesces with alkalis; and is an effectual solvent of the *materia alimentaria*. It possesses the property of coagulating albumen, in an eminent degree; is powerfully antiseptic, checking the putrefaction of meat; and effectually restorative of healthy action, when applied to old, fœtid sores, and foul, ulcerating surfaces.

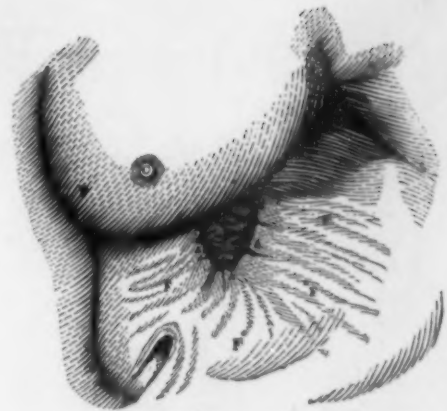
Saliva and mucus are sometimes abundantly mixed with the gastric juice. The mucus may be separated, by filtering the mixture through fine linen or muslin cambric. The gastric juice, and part of the saliva will pass through, while the mucus, and spumous or frothy part of the saliva, remains on the filter. When not separated by the filter, the mucus gives a ropiness to the fluid, that does not belong to the gastric juice, and soon falls to the bottom, in loose, white flocculi. Saliva imparts to the gastric juice, an azure tinge, and frothy appearance; and, when in large proportion, renders it fœtid in a few days; whereas the *pure* gastric juice will keep for many months, without becoming fœtid.

The gastric juice does not accumulate in the cavity of the stomach, until ali-

mentary matter be received, and excite its vessels to discharge their contents, for the immediate purpose of digestion. It then begins to exude from its proper vessels, and increases in proportion to the quantity of aliment *naturally* required, and received. A definite proportion of aliment, only, can be perfectly digested in a given quantity of the fluid. From experiments on artificial digestion, it appears that the proportion of juice to the ingestæ, is greater than is generally supposed. Its action on food is indicative of its chemical character. Like other chemical agents, it *decomposes*, or *dissolves*, and combines with, a fixed and definite quantity of matter, when its action ceases. When the juice becomes *saturated*, it refuses to dissolve more; and, if an excess of food have been taken, the residue remains in the stomach, or passes into the bowels, in a crude state, and frequently becomes a source of nervous irritation, pain and disease, for a long time; or until the *vis medicatrix naturæ* restores the vessels of this viscus to their natural and healthy actions—either with or without the aid of medicine.

Such are the appearance and properties of the gastric juice; though it is not always to be obtained pure. It varies with the changing condition of the stomach. These variations, however, depend upon the admixture of other fluids, such as saliva, water, mucus, and sometimes bile, and, perhaps, pancreatic juice. The special solvent itself—the *gastric juice*—is, probably, invariably the same substance. Derangement of the digestive organs, slight febrile excitement, fright, or any sudden affection of the passions, cause material alterations in its appearance. Overburthening the stomach produces acidity and rancidity in this organ, and retards the solvent action of the gastric juice. General febrile irritation seems entirely to suspend its secretion into the gastric cavity; and renders the villous coat dry, red and irritable. Under such circumstances, it will not respond to the call of alimentary stimulus. Fear and anger check its secretion, also: the latter causes an influx of bile into the stomach, which impairs its solvent properties.

When food is received into the stomach, the gastric vessels are excited by its stimulus to discharge their contents, when chymification commences. It has been a favourite opinion of authors, that food, after it has been received into the stomach, should "remain there a short period before it undergoes any change"; the common estimate is



"A LID ON HIS STOMACH"

This is the hole that remained in the subject after the shotgun wound healed. The opening was directly into his stomach so that bits of food could be inserted and samples of gastric juice taken out. He served Dr. Beaumont as servant and subject of experiment for about four years, then returned to Canada. He lived to be ninety.

one hour. But this is an erroneous conclusion, arising from inaccuracy of observation. Why should it remain there, unchanged? It has been received into the organ which is to effect an important change upon it—the gastric juice is ready to commence its work of solution soon after the first mouthful is swallowed; and, certainly, if we admit that the gastric juice performs the office of a chemical agent, which most physiologists allow, it is contrary to all our notions of chemical action, to allow it one moment to rest. It must commence its operation immediately. That it does so, is distinctly manifested by close observation of its action on food, in the healthy stomach.

Science News Letter, July 4, 1931

REFRIGERATION

Ice Hung in Baskets Melts More Slowly

KEEPING ice away from refrigerator walls by suspending it in baskets prevents it from melting too fast and gives a more stable and evenly distributed cooling effect, according to experiments conducted by Charles F. Belshaw and reported to the American Society of Refrigerating Engineers, New York City.

Not only may insulating walls be made thinner because the ice is not in contact with them, Mr. Belshaw states, but air circulation is bettered, so that the cooling effect is more evenly distributed and better regulated.

Science News Letter, July 4, 1931

PHOTOGRAPHY

New Moving Pictures in Colors Use Tiny Colored Squares

TINY colored squares, each a seven hundred and fiftieth of an inch on a side, in orange, green and blue-violet, make possible the latest method of color movies. The new process, known as the Spicer-Dufay process, after its originators, was demonstrated recently to members of the Royal Society, in London. In a report to *Nature*, Dr. T. Thorne Baker comments on the faithfulness with which colors are reproduced.

Though novel in its application to the cinema, the system of using colored squares, through which the picture is exposed, is quite old in still photography. Before the War such a process was used commercially. This was known as the Paget process, and the colored squares were made on a screen that was placed in front of the plate when it was exposed. The colored squares were so small that they could only be seen with a microscope. With the naked eye, the screen appeared of a uniform grayish color.

The exposed plate, after development, showed a similar arrangement of squares, though uncolored, when viewed with a microscope. One square, on the negative, would be a record of the blues in that part of the picture, the one next to it, perhaps, of the red, and the one below it of the greens. From this negative, a transparent positive picture was made on another plate.

A screen, similar to that through which the picture was taken, was then carefully adjusted over this positive, and a reproduction of the original scene, in full color, was the result.

In the Spicer-Dufay process, a similar method is applied to the movies, and a very ingenious system is used to prepare the colored screen, which is placed right on the film. Starting out with a base of cellulose acetate, or non-inflammable film, one side is dyed green all over.

375 Lines in an Inch

Then the film is run through a special printing press, which prints on the green surface a series of parallel black lines, 375 to the inch, with equal clear space between. The film is then run through a bleaching bath, which dissolves out the green color in the intervening clear spaces; and then through a bath of orange dye to fill them in again. Next is a treatment with revolving brushes in tanks of benzol to remove the inked lines.

They have protected the green dye beneath them, so the result is a series of alternate orange and green lines, 375 of each to the inch. Then ink lines are printed over the film at right angles to the first, and after bleaching, a blue-violet dye is applied, and when

the ink is removed again, minute areas of all three colors cover the film.

After protecting layers are laid over the mosaic of color, a fast photographic emulsion, sensitive to all colors, is applied, and the film is ready for use. It is exposed in the camera, which requires no special attachments, and developed. But instead of making a print in the usual manner from a negative, the original film is "reversed" and converted into a positive itself. As the colored squares are still in the same relative position with respect to the negative as when exposed, a spot of the film that was exposed to green light appears green. This is because the film is black behind the orange and blue-violet square, so only green light can get through. The same thing is true of other colors.

Though this reversed negative is now capable of being projected on the screen, it is necessary to make copies if the method is to be practicable. Ordinarily, to copy this film directly on another unexposed film would result in unpleasant "moire" effects, such as can be seen when two screens are held together against a light background. However, this has been avoided, says Dr. Baker, using a lens in printing. This lens has very slight depth of focus, which means that it will focus sharply in one plane, while a point very slightly nearer to or farther from the lens will be out of focus.

Light passes through the original film, and the lens forms the picture on a strip of unexposed film, the two films moving along together. The actual picture, made of grains of silver, is focussed sharply, but the colored mosaic, only a twenty-five hundredth of an inch farther back, is diffused, and moire effects thus avoided. In making the copy, as in making the original film, the light passes through the film base before reaching the sensitive emulsion, unlike ordinary still or movie films, in which the film faces away from the lens.

The process can also be used for sound films, as it is possible to leave an uncolored strip a tenth of an inch wide along the side to take the sound track.

Science News Letter, July 4, 1931

The University of Michigan has a transportation library containing 70,000 books, reports, maps, and other items and said to be the most complete collection of its kind in the United States.

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MEDICINE

Lack of Proper Food May be Cause of Nearsightedness

Study of Years Following World War Shows That Defect Prevails When General Health Conditions Are Poor

EVIDENCE that nutrition has a bearing on nearsightedness has been found by Dr. T. H. Butler, medical officer of the Coventry Eye Clinic, London.

Most people have the impression that shortsight, nearsightedness, or myopia, as it is variously called, is due to excessive or incorrect use of the eyes. From experience at the clinic, Dr. Butler publishes his conviction that the number of nearsighted children is increasing, and his belief that the use or abuse of the eyes has nothing to do with it.

"I believe that the true cause is a hereditary weakness in the scleral coat of the eye, which is aggravated by malnutrition and toxic influences of all kinds," said Dr. Butler. "Not only do I frequently obtain actual evidence of hereditary shortsight, but the final degree can often be foretold by a study of the myopia of the relatives. If, for example, a mother has seven dioptries of

myopia, her shortsighted child will probably reach approximately this figure."

Records taken at the Coventry Eye Clinic show that among elementary school children the occurrence of simple myopia remained stationary at about 9 per cent. from 1920 to 1924, when it began to rise, to reach to about 15 per cent. The curve of total myopia, that is, plus cases of myopia astigmatism, fell from 38 per cent. in 1920 to 22 per cent. in 1925. In 1926 the curve rose rapidly to 38 per cent., where it remained until 1928. There was a slight drop to 35 per cent. in 1929.

"There can be little doubt," says Dr. Butler, "that the variation of the curves

represents an alteration in general health conditions. The myopic curve is a nutrition curve. During the boom period after the War wages were high, and the nutrition of working-class children was good. The year 1926 began the period of increasing unemployment, with the inevitable result of diminishing comfort in the home and insufficient and unsuitable food for many children."

Science News Letter, July 4, 1931

ENGINEERING

Ship Uniformity Desired For Simplified Harbors

AN INTERNATIONAL understanding that ships shall not extend more than 35 feet into the water nor more than 160 feet above water is urged by Dr. C. E. Grunsky, San Francisco engineer and president of the American Engineering Council.

Ports could then plan their development for ships of a maximum size and bridges across harbors could have a maximum clearance under which all funnels and masts could pass.

Science News Letter, July 4, 1931

PSYCHOLOGY

Toy Hammer Tests Musical Talents of Young Children

A DEVICE designed to record the rhythmic responses of babies and thus determine their potential musical talents so that early intelligent control of musical environment can be started, has been developed by Prof. Harold M. Williams of the University of Iowa Child Welfare Research Station and Fellow of the National Research Council, who has carried to completion experiments started by others.

By means of his new instrument Prof. Williams can pick out in a few minutes the child who has particular musical talents.

The chief feature of the device is a "rhythm hammer" which appeals to

children as an interesting toy. The child to be tested is told to tap the hammer in time with the tick of a special, electrically-driven clock.

The rhythm kept by the clock can be adjusted and is regulated by lugs on the turntable of a phonograph on which is also recorded the tapping of the child.

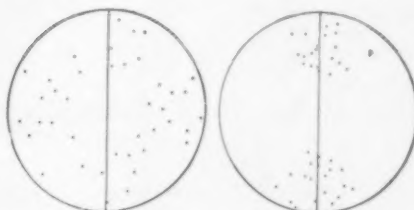
If the child taps exactly when the clock ticks, a dot is registered on a line drawn through the center of the paper covering of the turntable. The nearer together the clock's tick and the child's hammer tap are, the closer will the dot appear to the line. If the child taps out of time with the clock, the dot will fall at some place away from the line. Children in an age range from three to eight years can be tested for rhythm by the Williams device. With three-year-olds, the tests were found to be 86 per cent accurate. With older children they were virtually 100 per cent correct.

Science News Letter, July 4, 1931



PLAYFULLY TESTING HERSELF

This little girl may be unconsciously testing her potential musical talents, so simple and so toy-like is the instrument she is playing with. It was devised by Prof. Harold M. Williams, of the University of Iowa, to record rhythmic responses of young children. The circles represent records made by two children. The one containing dots concentrated around two points indicates a fair sense of rhythm; the other was made by a child with a poor sense of rhythm.



PHYSICS

Elusive Aurora is Duplicated In Evacuated Glass Tube

THE AURORA borealis, elusive will-o'-the-wisp of the high heavens, has been reproduced in the laboratory. Recent experiments of Dr. Joseph Kaplan, physicist of the University of California at Los Angeles, have shown that the same peculiar light emanations which glow in polar atmospheric heights can be made by electric discharge in a glass tube. This discharge is passed through extremely rarefied nitrogen.

Heretofore a number of shades of light emanation, represented by specific lines of the red and green spectrum have been observed only in the aurora. Their source has been unknown, although the influence of nitrogen has been suspected.

Dr. Kaplan exhausts a borosilicate glass tube until it retains only one millionth of its normal air content. At such a high degree of exhaustion an electric potential of 25,000 volts is barely able to force through a luminous discharge. Such evacuation of itself is not novel; but in the recent experiments the process of discharge was continued intermittently for weeks, during which much of the scanty gas content of nitrogen and oxygen disappeared and was replaced from the outside. Finally the residual gas, largely nitrogen, gave forth the ruddy aurora glow. The exhibition improved with each day of operation.

It is suspected in the Los Angeles laboratory that some chemical change, as yet unknown, has occurred on the inside walls of the tube. This change, strangely enough, makes the discharge act as though the tube were not there. This is exactly what Dr. Kaplan wishes, inasmuch as he suspects that it is the presence of the unnatural glass wall that has interfered with artificial aurora phenomena in past experiments. This would favor the present plausible theory that the aurora results from natural electric discharge at great altitudes, perhaps one hundred miles or more. At such elevations the atmospheric pressure is much like that in the experimental tube, but of course minus the glass walls.

Science News Letter, July 4, 1931

OCEANOGRAPHY

New Science Ship Will Work Across Ocean

A NEW SHIP, the *Atlantis*, built especially for scientific work at sea, is now on the way to America, but since she will go to work even on her maiden voyage she will not arrive at her destination until about the first of September.

The *Atlantis* was built at Copenhagen for the Woods Hole Ocean-

ographic Institution. She is a steel boat of approximately 380 tons displacement, 142 feet long, 29 feet beam and 16 feet extreme draft. She carries a 250 horsepower Diesel engine, and can cruise under power alone for 3,000 miles at eight knots; with sail she can extend her radius indefinitely. She carries two laboratories, and living accommodations for twelve or sixteen persons.

She left Copenhagen for Plymouth, England, a few days ago, and will set sail from the latter port about July 10 for Woods Hole, Massachusetts.

On the way over she will turn from her course for two north-south profiles across the North Atlantic Drift, one on the longitude of the Azores, the other about fifty degrees west longitude. Another profile will be run off the coast of Nova Scotia. On these scientific runs special attention will be paid to the distribution of the smaller life of the sea in its relation to light penetration into the water and also to the capture of fish that swim at great depths. Chemical studies will also be made of sea water at stations between Europe and America.

The physical studies will be in charge of the commander of the *Atlantis*, C. O. Iselin, the biological work will be conducted under Dr. George L. Clarke, and the chemical researches will be made by Dr. F. Zorell of the Deutsche Seewarte.

Science News Letter, July 4, 1931

METALLURGY

Magnetism Reveals Differences in Steel

MAGNETISM will detect differences in hardness of otherwise similar bars of steel, it was revealed in a report by Haakon Styri of Philadelphia to the American Society for Testing Materials.

Steel bars that test magnetically the same before heat treatment will test magnetically the same afterwards, Mr. Styri said, provided no differences in hardness or impact strength are brought about during the heating and quenching processes. Mr. Styri's method of testing is to place the steel bars in a magnetic field and note whether the steel would make a good core for an electromagnet.

Former methods of testing uniformity in steel hardness, according to the report, have required mechanical means which involve partial destruction of the steel, whereas the testing of the steel's magnetic properties does not have this disadvantage.

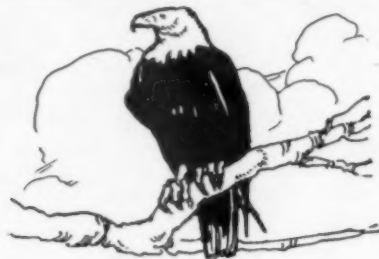
Science News Letter, July 4, 1931

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American Eagles

TODAY is the day when, according to the tradition of the Fathers of this Republic, the American eagle screams his proudest. The bald eagle, chosen by our early statesmen to be our national crest, is a truly noble-appearing bird, with his stern, piercing eye glancing out from a pure white head. For the term "bald" is a puzzling misnomer; the only explanation that can be guessed is that it is due to these snowy feathers, a feature unique among eagles. The bald eagle's tail also is white, but the rest of the body and the wings are clothed with feathers so dark brown that they are sometimes said to be black.

Another eagle found in America, which has by inadvertence replaced the bald eagle on at least one American coin, the half-dollar, is the golden eagle. He is an even larger bird than the bald eagle, for his wing-spread averages seven feet or more, and the spread of the bald eagle is a little less than this, as a rule. This eagle also is brown, but his tail is white-and-black instead of all white, and the feathers on back of his head and neck have a yellowish tinge, which accounts for his name. The outstanding mark of distinction between the two species, however, is the "trousered" leg of the golden eagle, as contrasted with the total absence of feathers on the shank of the bald. Only the young of the bald eagle have these leg-feathers, and this sometimes causes juvenile bald eagles to be mistaken for the golden species.

Since we have settled upon an eagle to be our own bird, it is perhaps more appropriate for us to take the bald eagle, since it is strictly American in its habitat, whereas the golden eagle is known from Europe and Asia as well as from this continent.

Science News Letter, July 4, 1931

SOCIAL SCIENCE

Fears New Discoveries May Vitate Disarmament Moves

FEAR THAT NEW scientific discoveries may make disarmament agreements invalid before they are fairly ratified was expressed in a recent address of Sir Samuel Hoare, formerly Minister for Air, and newly re-elected president of the British Science Guild. The Guild was founded by the late Sir Norman Lockyer, K. C. B., F. R. S., to promote the application of scientific methods and results to social problems and public affairs.

In his address, Sir Samuel said: "The question of armaments is going to be the central question of foreign politics in the immediate years before us. Already the whole problem bristles with difficulties. I believe that if the discussions at Geneva next February are to be really useful, the scientific aspects of disarmament should be brought into even greater prominence than its political and financial aspects."

"Suppose, for instance, that agreement were reached as to the quantity and quality of existing armaments, the labors of Geneva would be practically wasted if science then developed new types of weapons outside the scope of the agreement."

"The main problem of disarmament

and by far the most difficult is the problem of these new weapons of destruction and the need for finding some means of controlling them. There has been far too great a tendency to think of the next war in terms of the last. If there is anything more certain than another it is that any future war will be very different from that of 1914."

"Should the world of science help these new developments of the weapons of destruction? The question is by no means a simple one, for scientists will discover these new rays and gases and explosives in the stride of their ordinary work. Can the world prevent invention and discovery being used for the purpose of destruction?"

"The world at large wants to know the truth about the possibilities of future warfare. If during the next six months the British Science Guild could produce a report upon the kind of questions I am suggesting, I am certain that it would be doing most useful work in instructing public opinion and in investigating a vital side of what will be the most prominent question in foreign politics during the next year or two."

Science News Letter, July 4, 1931

ASTRONOMY

Encke's Comet Observed By Argentinian Astronomer

ENCKE'S COMET, the most frequently-returning of these visitors from space, has been observed for the first time on its present visit to the neighborhood of the sun by a South American astronomer, Señor Bobone, at the Cordoba Observatory, Argentina. The comet was picked up on a photographic plate taken late on Sunday night, June 21, and the information was relayed to Science Service through Dr. Harlow Shapley, director of Harvard College Observatory, Cambridge, Mass.

The comet when observed was of the ninth magnitude, considerably fainter than the smallest stars visible to the

naked eye, which are of about sixth magnitude. It will therefore need to come closer to the earth if it is to become visible. It was picked up in the position which astronomers designate as right ascension 7 hours 35 minutes 24 seconds, declination 8 degrees 22 minutes north. These are the celestial equivalents of latitude and longitude. They correspond to a spot near the present positions of the planet Jupiter and the bright star Procyon, which may be seen well to the east at about nine o'clock in the evening, and high in the south at midnight.

Science News Letter, July 4, 1931

• First Glances at New Books

Anthropology

THE MAKING OF MAN: AN OUTLINE OF ANTHROPOLOGY—Edited by V. F. Calverton—*Modern Library*, 879 p., 95c. With such well-known names as Boas, Frazer, Westermarck, Rivers, Lowie and Sumner among his contributors, this book would seem to be well worthy of the title, "Golden Treasury of Anthropology," which an admiring early reader bestowed upon it but which the editor, with becoming modesty, would wave aside.

Science News Letter, July 4, 1931

Physiology

ADVENTURES IN BIOPHYSICS—A. V. Hill—*University of Pennsylvania Press*, 162 p., \$3. "The real reasons why we did the things we did, the delays and imperfections and perplexities that beset us, the misery of continual failure, the joy of occasional success, the faith that with patience and persistence we should find the unknown something we were sure was there—all these are unfitting in a scientific periodical, yet somewhere a hint at least of them should be recorded." To give such a record is the object of these lectures delivered as the inaugural series under the Johnson Foundation for medical physics at the University of Pennsylvania by the Foulerton research professor of the Royal Society. The mechanics of muscular contraction, the conception of the steady state and other topics are described.

Science News Letter, July 4, 1931

Mineralogy

THE MINERALS OF NEW YORK CITY AND ITS ENVIRONS—J. G. Manchester—*New York Mineralogical Club*, 168 + xvii p., 127 pl., \$2.50. A great deal of interesting information about the minerals to be found in a fifty-mile radius about New York. There is an extensive locality list, with minerals found at each place, and a very complete bibliography.

Science News Letter, July 4, 1931

Aviation

THE AIRCRAFT MECHANICS' HANDBOOK—I. W. Miller—*McGraw-Hill*, 174 p., \$2. Probably the most resourceful mechanics, at least among the younger generation, will be found around airplane hangars and shops; the most rapidly-developing of present-day transportation industries is a challenge and attraction to them. Written especially for

their use is this compact but complete little book, giving practical hints for jobs all the way from loosening a balky nut to assembling an engine or setting a propeller.

Science News Letter, July 4, 1931

Philosophy

SCIENCE AND RELIGION—Twelve Authors—*Scribners*, 175 p., \$1.75. A round dozen of leaders in both fields who have the gift of words to tell the common man what they are thinking about all have their say in succession. Naturally, when the list includes such diverse minds as Eddington, Malinowski, Dean Inge and Father O'Hara, you will expect to "come out by that same door where in you went"; yet certainly not without much entertainment and profit from having heard "doctor and saint in learned argument."

Science News Letter, July 4, 1931

Aviation

AIR TRANSPORT OPERATION—Wesley L. Smith—*McGraw Hill*, 316 p., \$4. In these days of rapid development in a new medium of travel and transportation, a book like Mr. Smith's will be welcomed both by executives struggling with problems already existent and by organizers of instruction for the young men who will have to face air transport problems of the future.

Science News Letter, July 4, 1931

Philosophy

SCIENTIFIC INFERENCE—Harold Jeffreys—*Cambridge University Press*, 243 p., \$3.25. A mathematical and philosophical analysis of the process of setting up a scientific generalization from the brute facts. The approach is largely from the standpoint of the theory of probability and the illustrations are taken from mathematical physics, cosmogony and geophysics. The fundamental starting point of the work is that it is possible, both in scientific and everyday experience, to make inferences with a high degree of probability beyond the data directly known by sensation.

Science News Letter, July 4, 1931

Physics

A TEXT BOOK OF PHYSICS—L. B. Spinney—*Macmillan*, 679 p., \$3.75. This is the fourth edition of an excellent standard text for university and college students. The arrangement of materials is conservative.

Science News Letter, July 4, 1931

Botany

WILD FLOWERS OF THE ALLEGHANIES—Joseph E. Harned—*Pub. by author*, 670 p., \$4.50. This is a book recommended without reservation, not only to the botanist and flower lover but to anybody who lives in or wanders through the eastern mountains of our country. It is a solid and substantial contribution to popular botanical literature, well and understandably written, illustrated with scores of clear-cut, diagrammatic line drawings and embellished with eight superb color plates by Miss Mary Eaton and F. S. Matthews. This book is sure to arouse enthusiasm in any understanding person who looks into it.

Science News Letter, July 4, 1931

Travel

VIAJANDO POR LOS ESTADOS UNIDOS—*Pan American Union*, 130 p., 25 C. An illustrated guide to the United States, printed in Spanish; containing, in addition to the usual information, many useful facts such as a list of the journals printed in Spanish and suggested excursions.

Science News Letter, July 4, 1931

Chemistry

QUALITATIVE CHEMICAL ANALYSIS—Herman T. Briscoe—*Van Nostrand*, 279 p., \$2.25. This is a book for students who have had an introductory course in general chemistry. The first part deals with the fundamental physico-chemical principles on which analysis is based. A detailed description of laboratory procedure and technique follows.

Science News Letter, July 4, 1931

Mining

MINING METHODS—C. A. Mitke—*McGraw-Hill*, 196 p., \$3. A compact but complete treatise on practical mining methods. It will be welcomed by men in the field as well as by teachers in schools of mining.

Science News Letter, July 4, 1931

Home Economics

CARE AND REPAIR OF THE HOUSE—Vincent B. Phelan—*Government Printing Office*, 121 p., 20c. Any household-er will fall upon this little book with enthusiasm, for it tells clearly and authoritatively how to repair leaky faucets, fix the screen door, and do successfully any other "odd jobs" that constantly demand attention.

Science News Letter, July 4, 1931